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CONTENTS

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STATEMENT OF THE PROBLEM

OBJECTIVES

HYPOTHESES

RESEARCH METHODOLOGY

RESULTS & DISCUSSION

FINDINGS

RECOMMENDATIONS/SUGGESTIONS

CONCLUSIONS

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APPENDIX/ANNEXURE

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- Schemenner, R.W., Huber, J.C. and Cook, R.L. (1987), "Geographic Differences and the Location of New Manufacturing Facilities," Journal of Urban Economics, Vol. 21, No. 1, pp. 83-104.

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IS LABOUR GETTING FAIR SHARE IN ORGANISED MANUFACTURING SECTOR?

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ABSTRACT

Indian economy faces an Herculean task of shifting labour force from agriculture sector to manufacturing, which is not possible without increasing the labour productivity and expanding the manufacturing itself. The slow growth of labour employment, its share and contribution in output, increasing capital intensity and low total factor productivity is cause of serious concern. The manufacturing sector can not attract skilled manpower unless it offers a fair share to its employees in the form of wages, salaries, old age benefits and social security. The present paper is an attempt to study the trend of share of labour in organised Indian manufacturing sector during period 1981-82 to 2010-11. We use ASI data at aggregate level to estimate a long run Cobb-Douglas production function and to compute Solow equation. The share of labour has been reduced to a quarter in 2010-11 from about a half in 1981-82 whereas the marginal productivity of labour has doubled in the same period. Although average wage rate has increased by 17 times at current prices but just doubled at constant prices during the selected period with hardly one percent growth rate of employment. The marginal productivity of labour increased from twice of average wage rate to four times. The contribution of labour to the manufacturing growth has been falling and more credit goes to the capital taking around 91 percent share. It is proposed that the extension of Mahtma Gandhi National Rural Employment Guarantee Scheme (MGNREGS) to industrial sector and policies to encourage Micro, Small, & Medium Enterprises (MSME)s to become large ones is the key to restructure the base of employment and national income.

JEL CLASSIFICATION CODES
I22, I23

KEYWORDS
Cobb-Douglas Production Function, Marginal Productivity of Labour, Growth Accounting.

1. INTRODUCTION

Indian economy faces an Herculean task of shifting labour force from agriculture sector to manufacturing, which is not possible without increasing the labour productivity and expanding the manufacturing itself. The slow growth of labour employment, its share and contribution in output, increasing capital intensity and low total factor productivity is cause of serious concern. The manufacturing sector can not attract skilled manpower unless it offers a fair share to its employees in the form of wages, salaries, old age benefits and social security. The present paper is an attempt to study the trend of share of labour in organised Indian manufacturing sector during period 1981-82 to 2010-11. A large number of studies are available on growth and labour productivity particularly on organised manufacturing in India. Some important studies are Aggarwal and Kumar (1991), Ahluwalia (1991), Balakrishnan and Pushpangadan (1994), Balakrishnan and Babu (2003), Banga (2005), Bidhe and Kalirajan (2004), Gangopadhyay and Wadhwa (1998), Goldar (1986 and 2000), and by Trivedi, Prakash, & Sinate (2000). However, most of other studies not quoted here focus on specific industries and not on manufacturing sector as a single entity. The rest of the paper is divided into three sections – research methodology, presentation of data and results & discussion.

2. RESEARCH METHODOLOGY

The present study uses secondary data from ASI at all India aggregated level on organised manufacturing sector from 1981-82 to 2010-11. The WPI has been computed using GDP at constant and current prices provided by RBI website in Handbook of Statistics on Indian Economy. The data has been taken on net value added as a measure of output (Q), number of employees as a measure of labour input (L), total invested capital (K), total emoluments as a measure of wage bill, interest paid and loans. To measure the contribution of labour, capital and technical progress in growth of output Solow equation in following form has been computed:

$dQ/Q = dA/A + \alpha\, dL/L + \beta\, dK/K$ ....(i)

where Q, L and K are output, Labour & Capital respectively and A, α, and β are measures of technical progress, share of labour and share of capital respectively. The following form of Cobb-Douglas production function has been used:

$Q = A\, L^{\alpha} K^{\beta} e^{\gamma T}$ ....(ii)

where A, α, β and γ are parameters showing total factor productivity, labour elasticity of output, capital elasticity of output and technical progress rate respectively. Following six regression equations have been estimated:

1) $\text{Ln } Q/L = \text{Ln } A + \beta \text{ Ln } (K/L) + u$
2) $\text{Ln } Q/L = \text{Ln } A + \beta \text{ Ln } (K/L) + \gamma T + u$
3) $\text{Ln } Q = \text{Ln } A + \alpha \text{ Ln } L + \beta \text{ Ln } K + u$
4) $\text{Ln } Q = \text{Ln } A + \alpha \text{ Ln } L + \beta \text{ Ln } K + \delta \text{ Ln } Q_{t-1} + u$
5) $\text{Ln } Q = \text{Ln } A + \alpha \text{ Ln } L + \beta \text{ Ln } K + \gamma T + \delta \text{ Ln } Q_{t-1} + u$

It is clear that Reg1 and Reg2 assume a constant returns to scale and this assumption has been relaxed in Reg3 and Reg4. However, at the time of analysis, it was noted that there exists serious autocorrelation in first four regressions which has been removed by entering the lagged variable Q_{t-1} in the production function. The marginal productivity of labour has been computed by differentiating the estimated production function.

3. PRESENTATION OF DATA AND RESULTS

It will be useful to have a glimpse of the major trends of organised manufacturing sector in India before starting analysis. We observe from Table I that it had an investment of Rs. 23.94 lakh crore employing 1.26 crore persons in 211660 factories in 2010-11. The number of factories have almost doubled growing at CAGR of 1.87 percent in the selected period of study i.e. 1981-82 to 2010-11. But number of employees have grown only 1.62 times at a CAGR of 1.11 percent whereas the total invested capital at current prices has gone up by more than 44 times at CAGR of 12.05 percent during the same period. This explains the reason for

increasing capital-labour ratio (K/L) in Table II. The industry needed just Rs 3.65 lakhs per labour in 1982 and now it needs Rs 12.93 lakhs investment for each worker at constant prices. The average number of employees per factory has been decreasing at a rate of 0.76 percent. Although the average wage rate also went up by 17 times at current prices but only doubled at constant prices during the period of study. The increasing capital-labour ratio (K/L) can be explained in terms of relatively increasing average wage rate and cost of capital ratio (w/r). (See Table II) It is also found that there is a medium, positive and significant correlation (0.581) between K/L and w/r ratios. It may be possible that the increasing prices of land, cost of doing business, higher fuel prices, shifting demand towards hi-tech products, stringent labour laws, liberalised economic policies with relatively cheaper financial capital has led to employment of capital intensive technologies, thereby causing slow growth of employment and falling share of labour. With these arguments, we do not suggest that the demand for labour should be increased by making it relatively cheaper, rather it implies that whole demand curve of labour should be shifted rightwards by broadening the industrial base, increasing its share in GDP and be made more inelastic by skill addition.

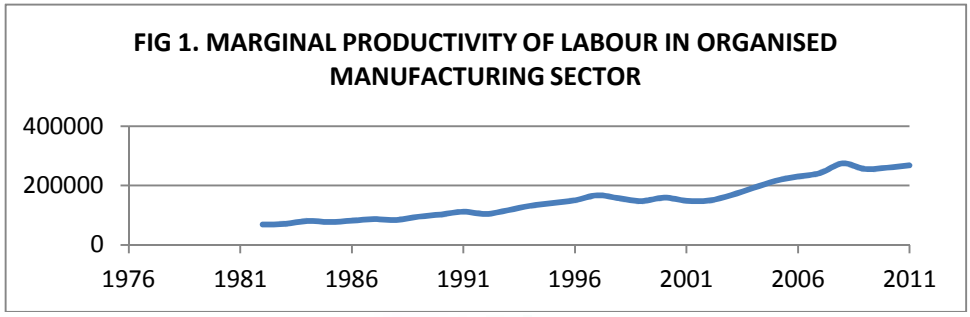
Further, to estimate the contribution of labour and capital to growth of net value added by the manufacturing sector, we present the results of Solow growth accounting equation in Table III. It can be seen that the contribution of labour to average 14.9 percent growth in net valued added is just 4.45 percent because its share ( ) is 0.345 and average growth of employment is only 1.8 percent. However, the contribution of labour to growth depends on what it gets and not what it produces. For that, we need to find out the marginal product of labour assuming whole manufacturing sector as a single firm. Therefore, we have estimated the Cobb-Douglas production function using regression analysis as mentioned in research methodology and its results are given in Table IV.

Firstly, It is important to note that we get fairly high values of R^2, Adjusted R^2 and F-ratios in all the six regressions implying that our list of selected independent variables is sufficient to explain most variation in the dependent variable. Since all the independent variables differ with each other in nature hence the problem of multicollinearity does not arise. In this time series data, since the dependent variable changes very slowly after taking a natural log hence, it is safe to assume the absence of hetereosedasticity. However, the problem of autocorrelation can not be ignored as we get very low D-W ratio in first four regressions and while interpreting, we keep in mind that the results of these regressions are biased. Even then, many useful deductions can be made. The Reg1 shows that in the given period the net value added has been increased by 1.202 percent with every one percent increase in capital with assumption of constant returns to scale (CRS). The coefficient of total factor productivity for Reg1 is 0.484 (Antilog of -0.725). In Reg2, along with CRS it is also assumed that we impute all growth of net value added to technical progress rate which is 3.95 per cent, which forces the initial estimate of Q (i.e. antilog of A) to almost zero and capital elasticity of output( ) to a low and insignificant level. In Reg3, the assumption of CRS is relaxed, and the labour, capital and technical progress have been allowed to absorb the variation in Q. It can be seen that labour elasticity of output( ) and technical progress rate are so large that they absorb maximum variation making again low and insignificant. This regression has some important meaning because if we assume that the technology really lies in the skills of labour then maximum value generation activity has been done by the employees and technical progress and not by capital. It may noted that DW ratio has improved but still showing presence of some positive autocorrelation. In Reg4, when we try to explain the variation in Q with labour, capital and total factor productivity, we find that capital alone absorbs maximum variation leaving insignificant and A small but significant. But low DW ratio suggests not to trust this model. Thus, in Reg5 and Reg6, the lagged value of net valued added i.e. Q_{t-1} has been introduced as explanatory variable to fix the problem of autocorrelation. Although, Reg6 has highest DW, but it gives almost zero value of A, which is away from reality. Considering all parameters, as it has high R2, Adj-R2, DW in reasonably acceptable limit, high F-ratio and significant values of , , and A with theoretically expected signs and values, we can choose Reg5 to measure marginal productivity of labour.

TABLE I: TRENDS OF FACTORIES, EMPLOYEES AND CAPITAL AND WAGES IN ORGANISED MANUFACTURING SECTOR

Year	No. of Factories	No. of Employees	Invested Capital (Rs. Lakhs)	Average no. of Employees per factory	Average Wage Rate at Current prices in Rs	Average Wage Rate at Constant prices in Rs
1982	105037	7777868	5399127	74.05	8714	45873
1983	93166	8009792	6299198	85.97	10045	48721
1984	96706	7824121	7249434	80.91	11782	52690
1985	100328	7871712	8050202	78.46	13542	56065
1986	101016	7471515	8811181	73.96	14831	57236
1987	97957	7441879	9769297	75.97	16527	59671
1988	102596	7785580	11393383	75.89	18086	59639
1989	104077	7743344	13297905	74.40	20312	61826
1990	107992	8142550	15914036	75.40	22608	63398
1991	110179	8162504	19491285	74.08	25221	63922
1992	112286	8193590	22123441	72.97	25594	57033
1993	119494	8704947	27772858	72.85	31660	64808
1994	121594	8707909	32054715	71.61	32889	61212
1995	123010	9100240	38753459	73.98	38836	65840
1996	134571	10044697	48996925	74.64	44915	69777
1997	132814	9448643	52215413	71.14	49111	70786
1998	136012	9997573	57682603	73.51	52384	70818
1999	131706	8588581	53706813	65.21	51960	65009
2000	131558	8253125	56663440	62.73	57970	70491
2001	131268	7917810	57179940	60.32	64057	75337
2002	128549	7686654	60591285	59.80	66426	75751
2003	127957	7870529	63747308	61.51	70082	77050
2004	129074	7803395	67959786	60.46	74758	79194
2005	136353	8383278	75941770	61.48	76827	76827
2006	140160	9038523	90157861	64.49	81881	78562
2007	144710	10252148	107150382	70.85	86568	78052
2008	146385	10378495	128012553	70.90	101597	86399
2009	155321	11252793	153517773	72.45	115030	90199
2010	158877	11722631	193305395	73.78	125404	92798
2011	211660	12639273	239471106	59.71	145132	99073
CAGR	1.87%	1.11%	12.05%	-0.76%	9.02%	2.02%

Source: Based on ASI data



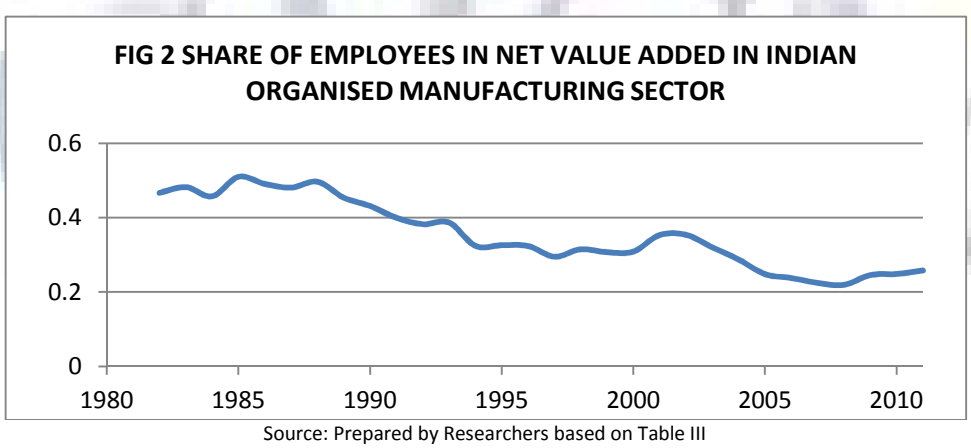
Source: Prepared by Researchers based on Table II

The marginal productivity of labour has been shown in Table II along with other variables. Now, it becomes evident that marginal productivity of labour has been grown at CAGR of 4.84 per cent which is double than the growth rate of average wages. Thus marginal product of labour which was twice the wages in 1982 has become four times in 2011. It is clear that the employees in manufacturing sector are not getting a fair share.

TABLE II : TRENDS IN COST OF CAPITAL, K/L & w/r RATIOS AND MARGINAL PRODUCT OF LABOUR (MP_L)

Year	% Cost of Capital (r)	(w/r) Ratio at Constant Prices	K/L at Constant Prices (Rs. Lakhs)	MP_L Constant Prices (Rs.)
1982	9.76	4701	3.65	98227
1983	10.58	4604	3.81	100962
1984	9.77	5396	4.14	115101
1985	10.17	5512	4.23	109851
1986	9.90	5779	4.55	116568
1987	10.11	5901	4.74	123970
1988	10.86	5492	4.82	120004
1989	14.81	4175	5.22	136145
1990	14.40	4404	5.48	146926
1991	14.24	4489	6.05	159957
1992	17.07	3341	6.01	149111
1993	14.03	4620	6.53	167541
1994	14.41	425	6.85	189010
1995	12.98	5073	7.22	202162
1996	14.53	4801	7.57	215592
1997	15.39	4601	7.96	240043
1998	14.05	5040	7.80	225067
1999	17.39	3738	7.82	211900
2000	17.29	4077	8.34	228336
2001	16.28	4628	8.49	213334
2002	15.68	4831	8.98	214084
2003	14.56	5292	8.90	240741
2004	11.72	6755	9.22	275517
2005	9.70	7922	9.05	310030
2006	9.50	8268	9.57	331053
2007	9.64	8098	9.42	348020
2008	11.34	7618	10.48	394614
2009	12.80	7045	10.69	367763
2010	11.11	8354	12.20	373771
2011	10.66	9292	12.93	384894
CAGR	-0.05 %	2.07%	3.93%	4.84%

Source: Based on ASI data



Source: Prepared by Researchers based on Table III

TABLE III: CONTRIBUTION OF LABOUR AND CAPITAL TO GROWTH OF NET VALUE ADDED IN MANUFACTURING SECTOR (1983-2011)

Year	dQ/Q	dL/L	dK/K	α	β	dA/A
1983	0.149	0.030	0.167	0.467	0.533	0.046
1984	0.208	-0.023	0.151	0.483	0.517	0.141
1985	0.037	0.006	0.110	0.458	0.542	-0.025
1986	0.080	-0.051	0.095	0.510	0.490	0.060
1987	0.132	-0.004	0.109	0.491	0.509	0.079
1988	0.109	0.046	0.166	0.481	0.519	0.000
1989	0.222	-0.005	0.167	0.497	0.503	0.141
1990	0.232	0.052	0.197	0.454	0.546	0.101
1991	0.207	0.002	0.225	0.431	0.569	0.079
1992	0.064	0.004	0.135	0.400	0.600	-0.018
1993	0.300	0.062	0.255	0.382	0.618	0.118
1994	0.241	0.000	0.154	0.387	0.613	0.147
1995	0.227	0.045	0.209	0.324	0.676	0.071
1996	0.285	0.104	0.264	0.326	0.674	0.073
1997	0.129	-0.059	0.066	0.324	0.676	0.104
1998	0.058	0.058	0.105	0.295	0.705	-0.033
1999	-0.126	-0.141	-0.069	0.315	0.685	-0.034
2000	0.065	-0.039	0.055	0.307	0.693	0.039
2001	-0.073	-0.041	0.009	0.309	0.691	-0.067
2002	0.005	-0.029	0.060	0.353	0.647	-0.024
2003	0.194	0.024	0.052	0.354	0.646	0.152
2004	0.178	-0.009	0.066	0.320	0.680	0.135
2005	0.281	0.074	0.117	0.287	0.713	0.176
2006	0.200	0.078	0.187	0.248	0.752	0.040
2007	0.269	0.134	0.188	0.237	0.763	0.093
2008	0.217	0.012	0.195	0.224	0.776	0.063
2009	0.096	0.084	0.199	0.219	0.781	-0.078
2010	0.122	0.042	0.259	0.245	0.755	-0.084
2011	0.204	0.078	0.239	0.248	0.752	0.005
Average	14.9%	1.8%	14.3%	0.358	0.642	5.2%

Source: Computed by Researchers based on All India ASI Data 1981-82 to 2010-11

TABLE IV: RESULTS OF REGRESSION ANALYSIS

	REG1	REG2	REG3	REG4	REG5	REG6
Dependent Variable	LN Q/L	LN Q/L	LN Q	LN Q	LN Q	LN Q
R^2	0.95	0.968	0.985	0.973	0.988	0.990
Adj-R^2	0.948	0.965	0.984	0.971	0.986	0.989
DW	0.441	0.720	1.114	0.519	1.427	1.767
F-RATIO	526* (1,28)	406* (2,27)	583* (3,26)	493* (2,27)	1134* (3,25)	612* (4,24)
Log A	-0.725* (-5.169)	-82.136* (-3.958)	-90.742* (-4.978)	-7.202* (-2.505)	-6.742* (-3.211)	-52.434* (-2.807)
Time (γ)		0.0395* (3.923)	0.0403* (4.615)			0.0217* (2.459)
Ln K/L (β)	1.202* (22.953)	0.228 (0.904)				
Ln L (α)			1.315* (4.710)	0.295 (1.305)	0.371* (2.363)	0.932* (3.460)
Ln K(β)			0.0909 (0.407)	1.092* 15.831	0.541* (4.895)	0.180 (1.012)
Ln Q_{t-1}					0.468* (5.420)	0.316* (3.152)

Source: Computed by Researchers based on All India ASI Data 1981-82 to 2010-11

1. Figures in parentheses are t-ratios for coefficients of variables and d.f. for F-ratios.
2.*shows significant at 5% level

4. DISCUSSION

The present paper does not divide the period of analysis into pre-reform or post-reform eras as has been done in a number of studies on manufacturing sector. Because, we do not intend to seek the reasons of low share of employees in value added in the economic reforms. However, now many of us agree that the reform process did not focus on accelerating the employment in organised sector rather converse is true. It has also been a consensus that it was not the foreign investment but domestic animal spirits of the entrepreneurs which contributed to the India growth story. The share of workers i.e. their wages and number in employment can be increased only by facilitating the employers. We also observe that huge sums have been allocated for the Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS). The implementers – Deputy Commissioners, Block Development Officers and Village heads are not creative enough to use the funds available for the scheme efficiently. If the scope of the MGNREGS is shifted from construction works in the rural areas to manufacturing sector, it will provide a big impetus to the industry and will help shifting the rural labour from primary activities to more value adding activities. The state can easily collect relevant records within a small time from the manufacturing sector (organised and unorganised) about employees. Then, it can offer that a part of wages to newly employed workers shall be financed by the state for certain period through funds of MGNREGS. It shall make micro, small and medium enterprises (MSMES) more competitive enabling them to become large. It is also noted that the size of the firm is most important factor leading to skill development and an average higher wage rate. Conclusively, we propose that the extension of MGNREGS to industrial sector and policies to encourage MSMES to become large ones is the key to restructure the base of employment and national income.

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